FINAL REPORT

Project Title: Care Coordination Enabled by Health IT: What Will It Take?

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Abstract

Purpose: Health information technology (health IT) offers tools for improving care coordination. We evaluated six proposed care coordination objectives for Stage 3 of the Centers for Medicare and Medicaid Services EHR Incentive Program ("Meaningful Use").

Scope: National primary care study of 350 clinicians and 13 practice sites.

Methods: We surveyed 350 clinicians (response rate 35%) about the perceived importance of, routine performance of, and use of computerized tools for care coordination activities. We observed care coordination workflows and interviewed clinicians/staff at a diverse set of practices.

Results: Variability existed in care coordination enabled by health IT. Clinicians' perceived importance of health IT support for care coordination did not coincide with current availability and use of that functionality. Factors that may contribute include 1) lack of agreement among providers and/or perception that Meaningful Use objectives have little impact on outcomes; 2) lack of understanding of care coordination functions; 3) unclear accountability for necessary care coordination actions; 4) variation in time and resources available and 5) widespread use of unstructured/fax-based data. To achieve proposed care coordination objectives, most practices need financial and technical support. Incentive programs should also allow use of other non-EHR systems.

Key Words: Primary care, Care coordination, Health IT

Introduction

The deployment of health information technology (health IT) promises to eliminate the fragmentation of information that leads to delays and redundancies in care and to support new team-based models of care. The proposed objectives for Meaningful Use Stage 3 of the CMS Medicare and Medicaid EHR Incentive Program provide a blueprint for sharing information through the EHR to allow more coordinated, patient-centered care. Information about the feasibility and measurability of care coordination enabled by health information technology (health IT) is critically needed to improve care and to inform federal policymaking. The National Committee for Quality Assurance (NCQA), the American Academy of Family Physicians National Research Network (AAFP NRN), and the Primary Care Information Project, New York City, Department of Health and Mental Hygiene (PCIP, NYC DOHMH) joined to study the feasibility, clinical acceptance, and ability to monitor six proposed Meaningful Use Stage 3 objectives related to care coordination in the outpatient setting (See box).

Methods

This mixed methods study focused on practices with a commitment to care coordination and use of EHR systems as demonstrated by existing recognition as a patient-centered medical home and participation in Stage 1 of Meaningful Use. This report summarizes the methods, results and conclusions from the two components of the study: a survey of 350 practices and case studies of 13 diverse practices about implementation of care coordination enabled by health IT. More detailed information is available in the two manuscripts that are being prepared for submission for publication.

Care Coordination Activities Originally Proposed as Objectives for Stage 3 of the Meaningful Use Program
• The clinical summary for patients should be pertinent to the office visit, not just an abstract from the medical record.
• Use computerized provider order entry for referrals/transition of care orders.
• Provide a summary of care record for each site transition or referral when transition or referral occurs with available information.
• Provider receiving referral acknowledges receipt of external information and provides referral results to the requesting provider, thereby beginning to close the loop.
• Electronic notification of a significant healthcare event in a timely manner to key members of the patient's care team, (significant event = arrival at an Emergency Department (ED), admission to a hospital, discharge from an ED or hospital, or death).
• Generate lists of patients for multiple specific conditions and present near real-time patient-oriented dashboards.
Note: The final list of proposed care coordination objectives that was submitted for consideration to the ONC was updated. The three referral-related objectives were merged under a single objective. The objective that contained "real time patient oriented dashboards" was not included in the final list.

Surveys. We surveyed clinicians from practices which had achieved recognition under NCQA's 2011 PCMH recognition. We stratified the sample by type of practice including hospital/health system/HMO-owned, small (<5 clinicians) physician-owned, and large (≥5 clinicians) physician-owned practices. We limited the sample to practices which had at least one clinician who had attested to the CMS Medicare EHR Incentive Program by September, 2013. However, we also included all federally qualified health centers (FQHCs) and community health centers (CHCs) because information on their participation in Medicaid EHR incentive programs administered by states was not available. The final sample included 275 community health centers, 284 health-system owned practices, 247 small physician-owned practices, and 191 large physician-owned practices. For each practice, we randomly chose one of the clinicians for the survey. We used

web-based surveys as well as fax and mail methods when email addresses were not available. The study protocol was reviewed by Chesapeake Research Review Inc., an independent accredited institutional review board.

Of the 997 study sample, 350 practices (35.1%) responded. The Practices with level 3 PCMH recognition were more likely to respond (37% for Level 3 versus 29% for Level 1 or 2); however there were no response differences by practice type, specialty, region of the country, or participation in the 2008 PCMH program. The respondents are fairly evenly distributed among different types of practices; three-quarters have level 3 NCQA medical home recognition (Table 1). Respondents report the use of a variety of EHR systems, with eClinicalWorks, Allscripts, Nextgen, and Epic having the largest representation.

Survey and Data Collection Instruments
We adapted questions from previous studies (Scholle, 2013; National Electronic Health Records Survey 2012, 2012; Solberg, 2008) and pretested the survey with several clinicians who use EHRs.   We used ten survey questions to capture the activities incorporated in six objectives proposed for Stage 3 of the Meaningful Use program. For each care coordination activity, we asked practices to report on whether the practice performed the activity routinely and whether they routinely used an electronic system (including an EHR or a non-EHR health IT tool) for that activity. We summarized these reports using two indices. The first index captured the number of care coordination activities performed routinely by a practice (0 to 10 activities). Because 40% of practices reported performing at least 9 activities, we dichotomized this index to compare practices performing all 10 activities to practices performing 9 or fewer activities. The health IT index used the count of the 9 care coordination activities for which an electronic system was used routinely plus whether the practice had remote access to their patients' medical records. Because this index had a more normal distribution, we used a continuous outcome variable.

We present descriptive analyses about the practice characteristics, performance of care coordination activities and use of a computerized system for care coordination, attitudes about care coordination objectives, and barriers. For continuous variables, we imputed values based on the mean of the practice type from which they were sampled. We used chi-square tests and logistic and linear regression analyses to test the associations of independent variables with the care coordination and health IT indices. Then we performed multivariable logistic regression to examine the percentage of practices doing all ten care coordination activities compared to less than ten activities, and multivariable linear regression for the health IT index score. SAS 9.4 was used for all analyses.

Practice Observations and Interviews. Thirteen diverse primary care practices were selected to assess current practice activities and use of computerized tools that support six care coordination functions.   Because the care coordination activities envisioned for Meaningful Use stage 3 were built on earlier requirements, we selected primary care practices that demonstrated a high level of commitment to care coordination and to the routine use of EHR technology as evidenced by two criteria: their participation in Meaningful Use Stage 1 and recognition as a patient-centered medical home.

Support for the study and recruitment of a majority of practices came from the Meaningful Outcomes Science and Innovation Center (MOSAIC), an AHRQ funded center of excellence in practice based research (1 P30 HS021647-01). MOSAIC represents 13 networks (three national and 10 regional) of primary care behavioral, medical and dental practices. MOSAIC generated interest with a call for willingness to participate in the study through collaboration with the leadership of each member PBRN. A one page narrative summary that outlined the purpose of the study, inclusion criteria as well as practice and lead physician's responsibilities was distributed according to the preference and/or processes of each PBRN network. Additionally, MOSAIC staff personally telephoned or emailed practices and physicians from under-represented geographic areas or practices they knew used a particular HIT vendor to increase sample diversity. Study group recruitment also was accomplished in collaboration with the New York City Primary Care Information Project.

Qualitative data collection included both direct observation and semi-structured interviews. Two field team members deployed to each site, spending between five and eight hours on site during routine clinic operation. Following these events, the field team members wrote summary remarks and augmented their in-clinic observations with additional details. During the on-site visit, the field team requested to observe workflows and patient data entry procedures, ask questions when it would not interfere with patient care, and hosted a breakfast or lunch during which additional staff could share their perspectives about care coordination, quality improvement and other related topics.

Using the approach of Bradley et al. (2007), we developed a structured template to generate a taxonomy (Patton 2002 and then used the data collected to identify themes (Ryan and Bernard 2003) using immersion and crystallization (Borkan, 1999). This approach distills complex systems into essential components by identifying conceptual elements that define key domains. For each of the six dimensions of care coordination we used immersion and crystallization to characterize overarching components of the domain or concept. As each of the six care coordination functions was summarized, crystallized and captured using the taxonomy-structured template, themes emerged based on repetition (e.g., common solutions across sites) and on relationships observed between and among care coordination functions and overall practice operations. We discussed and identified themes that suggest a relationship among concepts and ones that reveal how in real practice settings, staff resolved or struggled with competing functions.

Results

Survey Results

Care coordination activities and use of EHRs for care coordination
Nearly all practices reported that they routinely send referral requests (92.3%) and respond to requests for information from clinicians receiving a referral (90.0%). (Table 2) Only about half of practices reported that they routinely tracked referrals until a report comes back from the consulting clinician (57.4% for non-urgent referrals and 68.6% for urgent referrals) and identified emergency department visits by their patients (63.1%). Health system practices were

significantly less likely to track routine referrals, and CHCs were significantly less likely to identify hospitalizations of their patients.

Interestingly, the activities that were most routinely completed were NOT the ones that were most routinely done using health IT. Computerized systems were routinely used for providing clinical summaries to patients (76.6%), sending referral requests (68.6%), and providing reminders for interventions or screenings (64.9%). Only 38.8% of practices identified emergency department visits using computerized systems. There were few differences in use of electronic systems for care coordination by practice type.

Overall, 21.1% of practices performed all ten care coordination activities. (Table 3) Regression analyses showed that support for care coordination, geographic location, having a non-clinician in charge of care coordination, and having a stronger capacity to change (based on the Change Process Capability Questionnaire (CPCQ) score) were associated with greater implementation of care coordination activities. Concern about the practice's financial health was related to lower implementation of care coordination activities.

On average practices conducted 6 of 10 items using EHR or non-EHR computerized systems. In a multivariable model, the change process strategies score was also significantly associated using health IT for care coordination (p <.0001), with each one point change in the CPCQ score showing an increase of 0.20 point in the index score. Having a non-clinician specifically responsible for care coordination was also significantly associated with performing more activities electronically (p=.01).

Importance of EHR functionality for care coordination and barriers
The proposed care coordination-related Meaningful Use objectives varied in importance to clinicians. They rated as "very important" timely electronic notification of hospital discharges (77.5%) and patient deaths (73.0%), followed by having referral results come back to the requesting provider (69.6%). The objectives which were valued least were specialist acknowledgement of patient information (32.9%), real-time patient dashboards (40.1%), and a Summary of Care record for referrals/transitions of care (42.3%). The largest barriers to coordinating patient care with other practices or facilities were time (39.9% rated as major barrier), money and other resources (35.1%), and information technology/EHR systems (32.1%).

Practice Observation and Interview Results

Clinical workflows and EHR technical capabilities needed to implement the proposed care coordination objectives were partially or fully present in the study practices (Table 4). However, there was substantial variation within and across practices in implementation of these functions. Results for each of the six target Meaningful Use functions are presented below.

Results from Practice Field Observations

Meaningful Use 3 Function 1: Clinical care summary
All practices had a process to offer patients clinical summaries at the end of the visit and

technical capability within the EHR to select sections and print or publish the data in the patient portal.   The "visit summary" took on several forms and formats across practices. Some practices printed the default visit summary from the EHR and then optionally wrote additional comments or highlighted or circled specific information before handing to the patient. Other practices provide patients with a printed copy of the visit note itself, rather than the default "visit summary" from the EHR.   Some practices chose not to share either the default summary or visit note with individual patients.

Meaningful Use 3 Function 2: Provider order entry and referral management
Workflows and EHR technical capabilities for objectives related to opening and closing a referral loop were generally available. However, these loops were not consistently closed. There were practice-level differences in the definitions used for the three proposed objectives related to the referral loop. For example, referrals could mean: 1) the initial request or order placed by the referring provider, 2) the pre-authorization required by insurers for treatment by a specialty practice, and/or 3) consult reports that were received from the specialty practice. Because of these different definitions, referrals were considered to be completed at different steps along the referral loop: when a patient received pre-authorization to see a specialty practice, when a visit with a specialty practice was scheduled, or when a consult note was received.

Meaningful Use 3 Function 3: Summary of care record
All practices provided relevant information about patients that they referred to other practices, though, only one practice routinely used the Summary of Care record defined by ONC. Most practices used a combination of patient-related information that was relevant to the specific reason for the referral.

Meaningful Use 3 Function 4: Referral loop
Practices generally gathered, organized, and sent patient information relevant to each referral request based on the patient's need and the type of referral. The content and data fields required by referral order forms differed across practices and EHR systems and the type of specialty practice. We observed practice staff completing and faxing pen and paper hardcopy forms that were unique for each specialty practice. Each EHR system used different values for referral status (e.g., new, open, addressed, pending, scheduled, closed, etc.), urgency (e.g., routine, urgent, or stat), and reason for referral (e.g., diagnosis, procedure, treat & evaluated, or clinical questions to be answered).

Meaningful Use 3 Function 5: Notification of outside health events
The technical capability to receive notification of events was limited by availability of electronic exchange with hospitals, emergency departments and other facilities. We observed electronic notification at several practices where either the practice used the same EHR system as a nearby affiliated hospital system or the practice routinely (e.g., daily) received an aggregate report of admissions/discharges/transfers of their patients via secure email. For other practices, notification of discharges from hospitals sometimes occurred upon receipt of a discharge summary or sometimes was only learned to have occurred if provided by the patient at a subsequent visit.

Meaningful Use 3 Function 6: Patient lists and real-time dashboards
While practices had the technical capability to generate patient lists for potential population management (a stage 1 requirement), the technical capabilities to support real-time dashboards for population health management were not present in the EHR. Some practices relied on methods that were not embedded in their EHR systems (e.g., third-party data warehouses and electronic reports generated by systems outside of the practice). Two practices were able to demonstrate their achievement of the predecessor Meaningful Use Stage 2 objective: "Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, or outreach". Although these two sites used this capability routinely, the EHR systems used at these practices did not have dashboard-like features (e.g., on-screen views of various health parameters for all patients on the patient list).

Results from Practice Interviews

Our interviews with clinicians and staff and observations produced themes that suggest that variation in implementation of care coordination functions is related to five prime factors: 1) lack of common understanding of care coordination functions; 2) unclear accountability; 3) variation in time and resources available; 4) widespread use of unstructured data and fax; and 5) perception that Meaningful Use objectives have little impact on patient outcomes.

Practices lack of common understanding of the intent of each aspect of care coordination.
Practices varied in their understanding and interpretation of the intent and value of the objectives regarding clinical visit summaries, referral management and patient dashboards. While all practices provided clinical visit summaries, few viewed the summaries as a tool to support effective patient engagement. Only one practice consistently reviewed the summary with patients; this was a solo practice where the physician printed the summary and discussed items with patients at the end of the visit. One practice complied with Meaningful Use by actually printing every visit summary, but they decided not to provide them routinely to most patients. Queries revealed concern that the content of the visit summary would overwhelm or confuse patients, particularly patients with low health literacy or limited English proficiency. Information about the visit was instead provided verbally, via hand-written notes, or through the provision of hardcopy educational materials.

All practices had workflows for referral management, but it was unclear how information from specialists was incorporated in the treatment plan. Practices scanned incoming consult notes into patients' records, but it was not clear how the information in the consult note was incorporated with the rest of the information in the patient record. None of the practices we studied continued to track referrals past the receipt of consult notes from specialty practices, so we did not observe a clear workflow for reviewing results with the patient and updating the care plan.

Finally, clinical and non-clinical staff understood that proactive population health management was an important aspect of improving care for patients, but they struggled to conceptualize a patient dashboard, the information it would contain, and how it could be used for proactive population health management (e.g., outreach).

There is unclear accountability between practices and other settings of patient care regarding care coordination.
Site staff interviewed had various understandings of the primary care practice's responsibility for care coordination. One example relates to notification about health care events. Among practices that received these notifications, clinicians and staff were primarily concerned about discharges from inpatient hospital stays and patient deaths. Practices had clear workflows for following up with discharged patients and recording information on deaths to avoid potentially embarrassing or uncomfortable calls to family members. However, most of the clinicians were unclear on their responsibility related to ED visits and hospital admissions. Only one of the 13 practices we visited was particularly interested in being notified of admissions to emergency departments because the providers believed they could influence whether or not the patient was ultimately admitted to the hospital. Most providers interviewed at other practices did not feel that they could exert a role in decisions made within emergency departments or inpatient hospital stays. Another example is the lack of clarity regarding who should ensure that a patient requiring a referral for care actually schedules the appointment and eventually sees the provider. Some practices assumed comprehensive accountability and actually made the appointment for the patient, called them to remind them of the appointment and stayed in direct contact with the referring practice to confirm a completed appointment.

Substantial time and resources are needed for care coordination.
Clinicians and staff indicated that the availability of trained staff limited a broader scope of management, such as proactive outreach to patients who had gaps in evidence-based care (e.g., needed immunizations and other clinical preventive services). The same was true for other activities, such as proactively managing health care events in other settings and tracking referrals.

Another consideration was the cost of implementing and customizing health IT. Some practices used EHR systems that were managed by a central information technology department; in these cases, the practices needed to submit requests to create, modify, or run patient lists, reports, or dashboards. Others had to work directly with vendors to make information sharing possible with different entities; this had implications for costs and training new workflows.

There is widespread use of unstructured data and facsimiles for sharing information.
Even though all of the practices in our study had fully implemented EHRs, the facsimile or unstructured documents were the most common tools for information coming from or sent to other settings. The capabilities of the specialty practices on the receiving end of referral requests determined whether or not referral order entry and information exchange capabilities were used. Likewise, EHR capabilities for receiving documents from other settings of care were neither configured nor used. Consult notes from specialty practices were usually received via traditional fax, scanned into the EHR system, and linked to the appropriate patient record, often to a note section of the EHR. Information about significant health events that occurred outside of the practice was most likely to be received as either faxed encounter documents (discharge summaries) or aggregate reports attached to secure emails (e.g., list of patients that were discharged in the past 24 hours). These modes of information exchange resulted in digital documents within the EHR that could not be electronically searched or, in most cases, linked to original referral order or visit.

<u>A common perception is that Meaningful Use objectives are administrative requirements without benefits for improved patient outcomes.</u>
Clinicians and staff in the study practices differed in opinion about the usefulness of monitoring and reporting care coordination activities for improving outcomes. Interviewees agreed conceptually that better care coordination resulted in improved quality (e.g., fewer delays in receiving specialty care, improved patient experiences, and fewer missed opportunities). However, many respondents did not see how achievement of the proposed Meaningful Use objectives would ultimately lead to these improved outcomes. For example, clinicians viewed the monitoring of administrative tasks (e.g., use of Summary of Care documents, receiving acknowledgments of receipt of external information, and knowing that a visit was scheduled with a specialty practice) as less useful than tracking down consult notes from specialty providers and discharge summaries in a timely fashion.

Discussion

Overall, we found that care coordination activities and the use of an EHR to support care coordination were limited even in this high-performing set of practices that have achieved PCMH recognition and participated in Stage 1 of the Meaningful Use program. This study is important as it highlights the challenges clinical practices face as they work towards incorporating health IT capabilities for care coordination. Very few (21%) practices routinely performed all ten proposed care coordination activities. In addition, a large gap existed between routinely conducting an activity and routinely using an electronic system to conduct that task (>20% gap for 6 out of 10 activities). The facsimile remains the most important tool in care coordination today. Still, the use of computerized systems is higher among this group of practices than that reported in a national survey of physicians (31% – 44% for care coordination activities) (DesRoches, 2013).

Importantly, current electronic capabilities for supporting care coordination are not consistent with clinicians' priorities. For example, respondents viewed receiving consultation reports from other clinicians or services identifying patients with a hospital admission or discharge as very important electronic capabilities but these activities that required information sharing across settings were among the least frequently currently used. The ability of practices to implement care coordination functions often depends on the willingness of receptor organizations (e.g., specialty practices receiving a referral request) and the shared understanding of accountability, and the resources to implement a referral (Meyers, 2010; American College of Physicians, 2010). The practices surveyed are actually more likely to have electronic communication with other facilities; in a recent study, only 14% of physicians overall reported sharing data electronically with providers outside their organization (Furukawa, 2014) and specialists are less far along than primary care in achieving Stage 1 Meaningful Use objectives (Wright, 2014), DesRoches 2013).

Care coordination is related to both internal and external characteristics of the practice. In our survey, practices with non-clinician staff assigned to coordinate care and with a higher capability for systematic change were more likely to implement care coordination activities and to conduct them electronically. In a large qualitative study, the most common care coordination strategy reported was identifying a referral or care coordinator to share responsibility for coordination

with a primary care provider (O'Malley, 2009). Practices that were observed to perform more aspects of care coordination objectives more often did so through additional staff and defined protocols of how to handle different events rather than have a dependable, comprehensive technology-based solution. Practices that aim to adopt enhanced care coordination objectives will face substantial implications for new staff, alterations in current workflow and increased need for internal coordination of information.

Compared to urban practices, surveyed practices located in rural or suburban communities had greater implementation of care coordination activities. This is consistent with reports of urban and suburban physicians having difficulty with coordinating and tracking patient care as their patients belonged to multiple medical systems (Khoong, 2013). The willingness of case study practices to adopt more robust care coordination practices was also conditioned by factors in the local and regional health services environment. These factors included: (1) participation in an integrated delivery system and the existence of other competing integrated delivery systems in a market; (2) a history of community health improvement driven by a dominant regional payer; (3) licensure, certification (e.g., federally-qualified health centers), or payment criteria that stress quality improvement; and (4) the existence of a Health Information Exchange of sufficient geographic coverage and participation that collects and makes available data elements necessary for the referral process.

Limitations

Our study is limited by the focus on selected primary care practices that have demonstrated commitment to care coordination and EHR adoption. We focused on this group in order to ask questions about the richer set of care coordination capabilities envisioned for Stage 3 of Meaningful Use. While our findings are unlikely to be generalizable to all practices, they illustrate the challenges and concerns that are likely to face other practices as they move towards adoption of Meaningful Use objectives. Due to resource and time constraints, we focused on individual primary care practices and did not solicit input from the specialty practices, emergency departments, and hospitals with which care was being coordinated. While the response rate was 35.1%, and practices with level 3 PCMH recognition were more likely to respond (37% for Level 3 versus 29% for Level 1 or 2), there were no response differences by practice type, specialty, region of the country, or participation in the 2008 PCMH program. We also aimed to perform explicit feasibility assessments of reporting each of the proposed objectives, but were unable to due to barriers such as a lack of technical capability necessary for required data elements, need for EHR vendor support or technical programming expertise, lack of permission from parent organizations of practices, and additional cost to participating practices. Nonetheless, our findings offer important insights into the current state of care coordination enabled by health IT among diverse practices across the country using many different types of EHRs.

Implications for Policy and Practice

Given the quantitative and qualitative findings, it is clear that care coordination activities involve technological and non-technological aspects of patient care and clinical practice. To encourage broad adoption of the proposed Meaningful Use objectives, CMS and ONC should consider how

to develop synergies between the EHR incentive programs and other quality reporting and improvement programs.

We recommend the following for policymakers and for clinical practices in order to improve care coordination with EHR technology.

For policy
- Provide a clearer rationale and argument for how the proposed care coordination objectives are tied to improved outcomes.
- Provide practices with examples of successful workflows related to care coordination for each of the objectives.
- Give Meaningful Use credit to practices for use of health IT that is not embedded in EHR systems. However, provide detailed technical specifications to promote vendor development of EHR systems to fully support care coordination and require them as part of the EHR certification process.
- Focus on improving interoperability so that data exchange occurs among various vendor products without requiring additional, error-prone steps, like transcription or scanning a document.
- Promote further research on how to facilitate "closing the loop" or the interaction between the primary care team and the patient after a referral (e.g., whether the clinical summary is being discussed with the patient and whether the consultant reports are reviewed with patients and a treatment plan is updated within the practices' EHR).
- Adapt the language of clinical visit summaries for patients and test them with consumers.

For practices
- Engage with other providers in the community to define accountability for patients' care across primary care, specialty care, emergency departments, and acute inpatient settings.
- Assign a non-clinician to have primary responsibility for care coordination and appraise realistically the level of effort, cost, and staff (e.g., time and training) that will be needed to perform care coordination.
- Incorporate measurement of care coordination into their quality improvement strategy.

Care coordination certainly involves EHR and non-EHR technology; yet, it also involves changes to the structure of practices, alterations to workflow, and emphasizes the need to clarify accountability across settings of care. Practices with better understandings of their roles and responsibilities across the continuum of care stated that they were likely to influence quality of patient care outside of their immediate setting.
For practices and providers to be able to shape care coordination – both inside and outside of their practice - demonstration, education and clarification of roles within the community may be needed. In several cases, technology did not appear to be the impediment; rather, practices that have common agreements with other entities at the community level or that were part of an integrated delivery system - not just between individual pairs of practices – were engaged in high levels of coordination along the continuum of care.

Conclusion

Practices vary in their capability to perform the proposed Meaningful Use objectives related to care coordination. To achieve these objectives, most practices will need financial and technical support to enhance or maximize the health information systems as integrated tools to perform the care coordination activities systematically. Greater delegation to non-clinicians can also improve care coordination. Further research with non-primary care healthcare facilities are needed to better understand how to engage and connect between settings. CMS and other incentive programs should consider including other electronic systems or processes beyond the electronic health record for meeting proposed objectives. They should also promote the acceleration of EHR features that enable efficient and accurate care coordination and requirements for interoperability among EHRs.

Table 1. Characteristics of Participating Practices

	Survey Respondents N=350 (%)	Case study Practices N= 13 (%)
Practice Type		
Community Health Center	91 (26)	4 (30.8)
Health System-Owned Practice	92 (26.3)	3 (23.1)
Physician-owned, < 5 FTE clinicians	88 (25.1)	4 (30.8)
Physician-owned, >= 5 FTE clinicians	79 (22.6)	2 (15.4)
Type of EHR system		
eClinicalWorks	71 (20.7)	4 (30.8)
Allscripts	50 (14.6)	3 (23.1)
NextGen	48 (14.0)	0 (0.0)
Epic	46 (13.4)	1 (0.8)
GE/Centricity	24 (7.0)	1 (0.8)
Other	104 (30.3)	4 (30.8)
NCQA Patient Centered Medical Home 2011 Recognition Level		
Level 3	269 (76.9)	NA
Have a non-clinician in charge of care coordination (%)	204 (58.3)	NA
Demonstration/pilot and PCMH payment (% yes)		
Both demonstration/pilot and PCMH payment	161 (46.0)	NA
Participated in demonstration or pilot ONLY	58 (16.6)	NA
Received payment for PCMH ONLY	60 (17.1)	NA
Did not participate in a demonstration/pilot or receive payment for being a PCMH	71 (20.3)	NA

Table 2. Routine Performance of Care Coordination Activities in Participating Practices by Practice Type (n=350)

Care Coordination Activity	All Practices (n=350)		Community Health Center (n=91)		Health System-owned (n=92)		Physician-owned, < 5 FTE clinicians (n=88)		Physician-owned, >= 5 FTE clinicians (n=79)	
	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)
1. Provide patients with clinical summaries of their visits	285 (81.4)	268 (76.6)	75 (82.4)	70 (76.9)	79 (85.9)	75 (81.5)	73 (83.0)	68 (77.3)	58 (73.4)	55 (69.6)
2. Send referral requests to other clinicians	323 (92.3)	240 (68.6)	86 (94.5)	67 (73.6)	82 (89.1)	63 (68.5)	80 (90.9)	56 (63.6)	75 (94.9)	54 (68.4)
3. Provide a comprehensive medical summary for each site transition or referral	243 (69.4)	159 (45.4)	65 (71.4)	33 (36.3)	51 (55.4)	37 (40.2)	66 (75.0)	48 (54.6)	61 (77.2)	41 (51.9)
4. Respond to requests for additional information from clinician receiving referral	315 (90.0)	189 (54.0)	79 (86.8)	41 (45.1)	79 (85.9)	46 (50.0)	86 (97.7)	55 (62.5)	71 (89.9)	47 (59.5)
5. Track urgent referrals until results or report come back	240 (68.6)*	181 (51.7)	66 (72.5)	56 (61.5)	47 (51.1)	36 (39.1)	68 (77.3)	48 (54.6)	59 (74.7)	41 (51.9)
6. Track non-urgent referrals until results or report come back	201 (57.4)		56 (61.5)		42 (45.7)		57 (64.8)		46 (58.2)	
7. Provider receiving referral provides referral results to the requesting provider	287 (82.0)	187 (53.4)*	66 (72.5)	34 (37.4)	75 (81.5)	51 (55.4)	77 (87.5)	50 (56.8)	69 (87.3)	52 (65.8)

Care Coordination Activity	All Practices (n=350)		Community Health Center (n=91)		Health System-owned (n=92)		Physician-owned, < 5 FTE clinicians (n=88)		Physician-owned, >= 5 FTE clinicians (n=79)	
	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)	Activity performed routinely (n, %)	Computerized system used routinely for activity (n, %)
8. Provide reminders for guideline-based interventions or screening tests to clinicians at the point of care	260 (74.3)	227 (64.9)	63 (69.2)	55 (60.4)	71 (77.2)	61 (66.3)	67 (76.1)	58 (65.9)	59 (74.7)	53 (67.1)
9. Identify patients who have had an ED visit	221 (63.1)	138 (39.4)	47 (51.7)	30 (33.0)	61 (66.3)	40 (43.5)	62 (70.5)	38 (43.2)	51 (64.6)	30 (38.0)
10. Identify patients who have had a hospital admission/ discharge	264 (75.4)*	171 (48.9)	51 (56.0)	35 (38.5)	73 (79.4)	50 (54.4)	77 (87.5)	49 (55.7)	63 (79.8)	37 (46.8)
11. Have a system for remote access to patient's medical record	n/a	283 (80.9)	n/a	68 (74.7)	n/a	82 (89.1)	n/a	67 (76.1)	n/a	66 (83.5)

*Significant difference seen across practice types at p<.0025 (Bonferroni adjustment for 20 comparisons)

Table 3. Performance of Care Coordination Activities and Use of Health IT and Association with Practice Characteristics

	Unadjusted n (%) of Practices that Performed 10 Care Coordination Activities (n=350)	Odds Ratio (95% C.I.) from Multivariable Regression for Care Coordination (n=332)	Unadjusted Mean Score for Health IT Index (Scale of 0-10) (n=350)	Beta Coefficient in Multivariable Regression for Health IT Index (n=332)	P-value
Overall	74 (21.1)		5.84		
Practice Type (%)					
Community Health Centers	17 (18.7)	1.59 (0.67, 3.78)	5.37	-0.31	0.41
Health System-owned	15 (16.3)	Reference group	5.88	Reference group	
Physician-owned, <5 FTE clinicians	22 (25.0)	1.74 (0.77, 3.92)	6.10	0.28	0.45
Physician-owned, >=5 FTE clinicians	20 (25.3)	1.52 (0.68, 3.43)	6.03	-0.09	0.80
PCMH Level (%)					
Level 1 or 2	13 (16.1)	Reference group	5.41	n/a	n/a
Level 3	61 (22.7)	1.57 (0.73, 3.35)	5.97	n/a	n/a
Financial Concern					
Less than Very Concerned	54 (23.8)	Reference group	5.92	Reference group	n/a
Very Concerned	17 (14.4)	0.43 (0.23, 0.83)	5.58	-0.43	0.13
Have a Non-Clinician in Charge of Care Coordination					
No	21 (14.4)	Reference group	5.29	Reference group	n/a
Yes	53 (26.0)	1.90 (1.02, 3.53)	6.23	0.69	0.01
Type of Area					
Urban	12 (12.1)	Reference group	5.52	n/a	n/a
Rural or Suburban	62 (24.7)	2.50 (1.17, 5.30)	5.96	n/a	n/a
Consultation/Collaboration Help for Care Coordination					
Did not receive help	7 (8.9)	Reference group	4.78	Reference group	n/a
Received help	65 (25.3)	2.64 (1.09, 6.42)	6.18	0.64	0.06
Change Process Strategies (1-17 point scale)	1.14 (1.06, 1.22)*	1.09 (1.003, 1.19)	5.84	0.20	<.0001

*Odds Ratio for 1-unit score change

Table 4. Practice Observation Results: Workflow and Technical Capability for Originally Proposed Stage 3 Meaningful Use Objectives

Meaningful Use Objective	Workflow Exists?	Technical Capability Exists?	Clinician and staff perceptions of value of the objective
1. Clinical summary that is pertinent to visit	Yes, all practices	Yes, all practices	Low Summary was not perceived as useful to patients or provided to all patients
2. Referral order entry	Yes, all practices	Yes, all practices	Low Seen as administrative task that did not directly lead to better outcomes
3. Summary of care record provided when referral occurs	Yes, all practices	Varied Some practices had EHR systems that supported the packaging of information about referred patients, but only one had a Summary of Care record feature	Low Summary of care record is not sufficiently specific for each patient referral
4. Acknowledgement of receipt and referral results provided	Most practices All practices had process for accepting results of referrals; most did not have process for receiving acknowledgements	No None of the practices had EHRs that capture acknowledgements as discrete data; All practices had EHRs that could attach referral results to the original referral request	Mixed Low value on receiving acknowledgements from referral recipients; high value on getting the results of the consult
5. Generate patient lists and real-time dashboards	Varied Some practices had workflows for patient dashboards but not in real time	Yes, all practices All practices could generate patient lists from EHR, but no EHR had real-time dashboard functions	High When staff and workflow were available to generate and act upon patient lists
6.Notification of significant health care events	Yes	No Not captured as discrete data in EHRs	High When providers felt accountable for decisions regarding inpatient admissions and post-discharge follow-up

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